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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
MERKLING, MATTHEW J	

ART UNIT	PAPER NUMBER
1797	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/706,625	BROY ET AL.
	Examiner	Art Unit
	Matthew J. Merkling	1797

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 26 September 2007.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1,4-12,14-22 and 24-31 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1,4-12,14-22 and 24-31 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claim 1, 5, 7-12, 17-22, 25, 27, 28, 30 and 31 rejected under 35 U.S.C. 103(a) as being unpatentable over Chowienczyk (GB 2 284 059 A) in view of Niedrach (EP 0180138).

With regard to claim 1, Chowienczyk discloses a gas sensor (Fig. 1 (4)), comprising:

a housing (Fig 4 (26)) including a cavity (illustrated in Fig. 4), the housing including an anode (a component of a gas sensing fuel cell (pg. 6 (4))) within the cavity (illustrated in Fig. 4);

a controller (microprocessor, Fig. 1 (12)) in communication (24) with the anode (4) and configured to measure sensor current output (pg. 8). One of ordinary skill in the art would recognize that the output from a fuel cell sensing means is a current as is evidenced by Ulkem (2003/0155240 A1, paragraph [0004]). Chowienczyk further discloses a controller (Fig. 1 (12)) configured to determine the remaining life of the sensor (pg 8).

Chowienczyk fails to teach that the controller is configured to subtract a cumulative current output of the sensor from a theoretical total to determine the remaining life of the sensor.

Niedrach also discloses a gas sensor that is equipped to determine the remaining life of a gas sensor (see abstract).

Niedrach discloses that basing the remaining life of an oxygen sensor on the date of manufacture or time in service (as is taught by Chowienczyk) provides for inefficient utilization of gas sensors as many times, gas sensors are taken out of service while they are still operational (page 8 lines 4-28). Niedrach remedies this inefficiency with the following configuration of gas sensor. Niedrach teaches an anode (counter electrode, 24) and a cathode (sensing electrode, 22) that are disposed in a gas sensor housing (10, see Fig. 1). Niedrach discloses a coulometer (156) that keeps track of a cumulative current that passes through the gas sensing circuit of Fig. 2 (page 10 lines 3-28). This cumulative current corresponds to an extent of oxidation on counter electrode 24 (page 10 lines 12-18). From this setup, Niedrach deduces the remaining life of the sensor by comparing (ie subtracting) the total current through the sensor (which corresponds to a certain level of oxidation on the anode) to the area of the anode disposed in the gas sensor (which corresponds to a theoretical total, page 10 lines 18-24). Using this technique, Niedrach is able to provide a more efficient method of determining the remaining life of a gas sensor than the technique taught by Chowienczyk.

As such, it would have been obvious to one of ordinary skill in the art at the time of the invention to change the residual life indicating method (by date) of

Chowienczyk with the setup of Niedrach, as described above and incorporate this setup in the controller of Chowienczyk in order to provide a more efficient technique of monitoring the remaining life of a gas sensor.

With regard to claim 5, Chowienczyk discloses the sensor, wherein the controller (Fig. 1 (12)) is further configured to communicate sensor data output such as a date of manufacture as well as other data pertaining to said sensor (pg. 7).

With regard to claim 7, Chowienczyk discloses the gas sensor, further comprising an analog to digital converter (Fig. 1 (22)) in communication with the controller (Fig. 1 (12)).

With regard to claims 8 and 9, Chowienczyk discloses the gas sensor of claim 7, further comprising a display (Fig. 1 (16)) in communication with the analog to digital converter (22) and configured to display the remaining life of the sensor (pg. 8). Chowienczyk further discloses said display can be a liquid crystal display (pg. 8).

With regard to claim 10, Chowienczyk discloses the controller (Fig. 1 (12)) coupled to a host (control unit, Fig. 1 (10), pg. 8).

With regard to claim 11, Chowienczyk discloses the host system configured to display the remaining life of the sensor (pg. 8).

With regard to claim 12, Chowienczyk discloses a gas sensor (Fig. 1 (4)), comprising:

a housing (Fig. 4 (26)) including a cavity (illustrated in Fig. 4), the housing including an anode (a component of a gas sensing fuel cell (pg. 6 (4))) within the cavity (illustrated in Fig. 4);

a controller (Fig. 1 (12)) in communication (24) with the anode (4) and configured to determine the remaining life of the sensor (pg. 8);

an analog to digital converter (Fig. 1 (22)) in communication with the controller (12); and a display (16) in communication with the analog to digital converter and configured to display the remaining life of the sensor (pg. 8).

Chowienczyk fails to teach that the controller is configured to subtract a cumulative current output of the sensor from a theoretical total to determine the remaining life of the sensor.

Niedrach also discloses a gas sensor that is equipped to determine the remaining life of a gas sensor (see abstract).

Niedrach discloses that basing the remaining life of an oxygen sensor on the date of manufacture or time in service (as is taught by Chowienczyk) provides for inefficient utilization of gas sensors as many times, gas sensors are taken out of service while they are still operational (page 8 lines 4-28). Niedrach remedies this inefficiency with the following configuration of gas sensor. Niedrach teaches an anode (counter electrode, 24) and a cathode (sensing electrode, 22) that are disposed in a gas sensor housing (10, see Fig. 1). Niedrach discloses a coulometer (156) that keeps track of a cumulative current that passes through the gas sensing circuit of Fig. 2 (page 10 lines 3-28). This cumulative current corresponds to an extent of oxidation on counter electrode 24 (page 10 lines 12-18). From this setup, Niedrach deduces the remaining life of the sensor by comparing (ie subtracting) the total current through the sensor (which corresponds to a certain level of oxidation on the anode) to the area of the anode disposed in the gas sensor (which corresponds to a theoretical total, page 10 lines 18-

24). Using this technique, Niedrach is able to provide a more efficient method of determining the remaining life of a gas sensor than the technique taught by Chowienczyk.

As such, it would have been obvious to one of ordinary skill in the art at the time of the invention to change the residual life indicating method (by date) of Chowienczyk with the setup of Niedrach, as described above and incorporate this setup in the controller of Chowienczyk in order to provide a more efficient technique of monitoring the remaining life of a gas sensor.

With regard to claim 17, Chowienczyk discloses the sensor of claim 12, and further discloses the display to be a liquid crystal display (pg. 8).

With regard to claim 18, Chowienczyk discloses a controller (Fig. 1 (12)) coupled to a host system (control unit, Fig 1. (10), pg. 8).

With regard to claim 19, Chowienczyk discloses the host system (10) configured to display the remaining life of the sensor (pg. 8).

With regard to claim 20, Chowienczyk discloses gas sensor, comprising:

a housing (Fig 4 (26)) including a cavity (illustrated in Fig. 4), the housing including an anode (a component of a gas sensing fuel cell (pg. 6 (4))) within the cavity (illustrated in Fig. 4);

means for measuring sensor output at the anode (Fig. 4 (4)) and determining the remaining life of the sensor (pg. 6-8).

Chowienczyk fails to teach that the controller is configured to subtract a cumulative current output of the sensor from a theoretical total to determine the remaining life of the sensor.

Niedrach also discloses a gas sensor that is equipped to determine the remaining life of a gas sensor (see abstract).

Niedrach discloses that basing the remaining life of an oxygen sensor on the date of manufacture or time in service (as is taught by Chowienczyk) provides for inefficient utilization of gas sensors as many times, gas sensors are taken out of service while they are still operational (page 8 lines 4-28). Niedrach remedies this inefficiency with the following configuration of gas sensor. Niedrach teaches an anode (counter electrode, 24) and a cathode (sensing electrode, 22) that are disposed in a gas sensor housing (10, see Fig. 1). Niedrach discloses a coulometer (156) that keeps track of a cumulative current that passes through the gas sensing circuit of Fig. 2 (page 10 lines 3-28). This cumulative current corresponds to an extent of oxidation on counter electrode 24 (page 10 lines 12-18). From this setup, Niedrach deduces the remaining life of the sensor by comparing (ie subtracting) the total current through the sensor (which corresponds to a certain level of oxidation on the anode) to the area of the anode disposed in the gas sensor (which corresponds to a theoretical total, page 10 lines 18-24). Using this technique, Niedrach is able to provide a more efficient method of determining the remaining life of a gas sensor than the technique taught by Chowienczyk.

As such, it would have been obvious to one of ordinary skill in the art at the time of the invention to change the residual life indicating method (by date) of Chowienczyk with the setup of Niedrach, as described above and incorporate this setup in the controller of Chowienczyk in order to provide a more efficient technique of monitoring the remaining life of a gas sensor.

With regard to claim 21, Chowienczyk discloses a system for determining the remaining life of a gas sensor, comprising:

a housing (Fig 4 (26)) including a cavity (illustrated in Fig. 4), the housing including an anode (a component of a gas sensing fuel cell (pg. 6 (4))) within the cavity (illustrated in Fig. 4);

a controller in communication with the anode (as illustrated in Fig. 1) and configured to measure sensor current output (pg. 8); and

a host system (control unit, Fig. 1 (10)) in communication with the controller (12) and configured to receive data output from the controller (pg. 8).

Chowienczyk fails to teach that the controller is configured to subtract a cumulative current output of the sensor from a theoretical total to determine the remaining life of the sensor.

Niedrach also discloses a gas sensor that is equipped to determine the remaining life of a gas sensor (see abstract).

Niedrach discloses that basing the remaining life of an oxygen sensor on the date of manufacture or time in service (as is taught by Chowienczyk) provides for inefficient utilization of gas sensors as many times, gas sensors are taken out of service while they are still operational (page 8 lines 4-28). Niedrach remedies this inefficiency with the following configuration of gas sensor. Niedrach teaches an anode (counter electrode, 24) and a cathode (sensing electrode, 22) that are disposed in a gas sensor housing (10, see Fig. 1). Niedrach discloses a coulometer (156) that keeps track of a cumulative current that passes through the gas sensing circuit of Fig. 2 (page 10 lines 3-28). This cumulative current corresponds to an extent of oxidation on counter electrode

24 (page 10 lines 12-18). From this setup, Niedrach deduces the remaining life of the sensor by comparing (ie subtracting) the total current through the sensor (which corresponds to a certain level of oxidation on the anode) to the area of the anode disposed in the gas sensor (which corresponds to a theoretical total, page 10 lines 18-24). Using this technique, Niedrach is able to provide a more efficient method of determining the remaining life of a gas sensor than the technique taught by Chowienczyk.

As such, it would have been obvious to one of ordinary skill in the art at the time of the invention to change the residual life indicating method (by date) of Chowienczyk with the setup of Niedrach, as described above and incorporate this setup in the controller of Chowienczyk in order to provide a more efficient technique of monitoring the remaining life of a gas sensor.

With regard to claim 22, Chowienczyk discloses the system of claim 21 (as described above), wherein at least one of the sensor and the host system is configured to display (16) the remaining life of the sensor (pg. 8).

With regard to claim 25, Chowienczyk discloses the sensor of claim 21 (as described above), wherein the controller (12) is further configured to communicate sensor data output such as the date of manufacture (pg. 7).

With regard to claim 27, Chowienczyk discloses the gas sensor of claim 21 (as described above), wherein the display (16) is a liquid crystal display (pg. 8).

With regard to claim 28, Chowienczyk discloses a method of determining the remaining life of a gas sensor, comprising:

measuring sensor current (or voltage) output by a controller (pg. 6);

determining the remaining life of the sensor (pg. 8).

Chowienczyk fails to teach that the controller is configured to subtract a cumulative current output of the sensor from a theoretical total to determine the remaining life of the sensor.

Niedrach also discloses a gas sensor that is equipped to determine the remaining life of a gas sensor (see abstract).

Niedrach discloses that basing the remaining life of an oxygen sensor on the date of manufacture or time in service (as is taught by Chowienczyk) provides for inefficient utilization of gas sensors as many times, gas sensors are taken out of service while they are still operational (page 8 lines 4-28). Niedrach remedies this inefficiency with the following configuration of gas sensor. Niedrach teaches an anode (counter electrode, 24) and a cathode (sensing electrode, 22) that are disposed in a gas sensor housing (10, see Fig. 1). Niedrach discloses a coulometer (156) that keeps track of a cumulative current that passes through the gas sensing circuit of Fig. 2 (page 10 lines 3-28). This cumulative current corresponds to an extent of oxidation on counter electrode 24 (page 10 lines 12-18). From this setup, Niedrach deduces the remaining life of the sensor by comparing (ie subtracting) the total current through the sensor (which corresponds to a certain level of oxidation on the anode) to the area of the anode disposed in the gas sensor (which corresponds to a theoretical total, page 10 lines 18-24). Using this technique, Niedrach is able to provide a more efficient method of determining the remaining life of a gas sensor than the technique taught by Chowienczyk.

As such, it would have been obvious to one of ordinary skill in the art at the time of the invention to change the residual life indicating method (by date) of Chowienczyk with the setup of Niedrach, as described above and incorporate this setup in the controller of Chowienczyk in order to provide a more efficient technique of monitoring the remaining life of a gas sensor.

With regard to claim 30, Chowienczyk discloses the method of claim 28 (as described above, further comprising communicating the date of manufacture (pg. 7) of the gas sensor.

With regard to claim 31, Chowienczyk discloses the method of claim 30 (as described above), further comprising displaying data from the sensor such as the date of manufacture (pg. 7, 8).

3. Claims 4, 14, 15, 24, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chowienczyk and Niedrach (EP 0180138) as applied to claims 1, 12, 21 and 28 above, and further in view of Say et al. (US 6,565,509).

With regard to claims 4, 14, 24 and 29, modified Chowienczyk fails to teach the data from the controller as being in an encrypted format.

Say also teaches an analytical sensor that includes a sensor (Fig. 1 (42)), a controller (control unit, (44)) and a means for displaying (46) acquired data from said control unit.

Say teaches data from said sensor and control unit as being encrypted in order to eliminate "crosstalk" and to identify signals from the appropriate control unit (col. 49 lines 38-42).

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the encryption of data from said sensor, as in Say, with the sensor of modified Chowienczyk in order to eliminate "crosstalk" and properly identify signals from the appropriate control unit.

With regard to claim 15, Chowienczyk further discloses the sensor of claim 14, wherein the controller (Fig. 1 (12)) is further configured to communicate sensor data output such as a date of manufacture as well as other data pertaining to said sensor (pg. 7).

4. Claims 6, 16, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chowienczyk and Niedrach (EP 0180138) as applied to claims 1, 12 and 26 above and in further view of Nordman et al. (US 6,287,519).

Regarding claims 6, 16, and 26, modified Chowienczyk fails to teach the microcontroller as being positioned inside the housing of the sensor.

Nordman also teaches a portable handheld gas (Fig. 1 (10)) sensor apparatus comprising a housing (12) including a cavity and a microcontroller (controller printed circuit, Fig. 4 (46)).

Nordman teaches a gas sensor (10) wherein the microcontroller (controller printed circuit, (46)) is contained within a housing (12) in order to make the gas sensor portable for use in repair garages for testing a vehicle exhaust emissions for compliance with minimum standards (col. 1 lines 14-23, col. 2 lines 1-18).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include the microcontroller within the housing (as in Nordman) with the gas

sensor of Chowienczyk in order to make said sensor handheld and portable for ease of use in applications such as testing vehicle exhaust emissions at a repair garage.

Response to Arguments

5. Applicant's arguments, filed 9/26/07, with respect to the rejection(s) of claim(s) 35 USC 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Niedrach (EP 0180138).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J. Merkling whose telephone number is (571) 272-9813. The examiner can normally be reached on M-F 8:30-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MJM

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